Interim Report

Survey of Homeowner Attitudes Regarding Hood Canal Water Quality and Sewage Treatment

DRAFT

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Introduction

The Hood Canal Coordinating Council administered a survey to 1,482 randomly selected homeowners in the Hood Canal watershed between March and May of 2005. From that total, 881 surveys were returned.

To help validate the survey, HCCC staff also obtained data collected from the US Census for the year 2000. Where direct comparisons could be made, there was in general excellent agreement between the demographic information between the surveyed population and the comparable population from the census. No statistical differences were detectable between the population demographics in the survey population versus the census population.[1] Therefore, we have assumed that the survey results represent a random sampling of the population of the Hood Canal watershed.

This report does not report on every single question in the survey. HCCC staff have taken the most salient information and compiled it into this interim report. We feel that the information will prove useful to governmental regulatory staff and policy makers, educators and interested members of the general public.

General Findings/Demographic Information

- The average age of the onsite systems in Hood Canal is 20 years old.[2]
- About 22% of homeowners do not know the age of their onsite sewage system. As an alternative, we asked the age of their home. The average age of homes for those who do not know age of their onsite sewage system is 28 years old.[3]
- There are more very old onsite sewage systems (installed before 1972) for those that have frontage on marine waters (Hood Canal) versus the rest of the watershed (Figure 1).[4]
- 96% of homeowners know where their septic tank is located.
- 92% of homeowners know where their drain field is located.
- 94% of homeowners know what type of onsite sewage system they have. The complete breakout of system types is shown in Figure 2.

On average, people have:

- Owned their Hood Canal home for 13 years[5]
- 2.4 occupants in their home[6]
- 2.5 bedrooms in their home[7]

[1] See Appendix A for all statistical analyses involving census data.
[2] 95% confidence interval for age of onsite sewage system installation: 1985 to 1987, n=608
[3] 95% confidence interval for age of home: 1975 to 1979, n=299
[4] $\chi^2_{.05,4} = 16.76$, $p<.005$
[5] 95% confidence interval for length of ownership: 12.5 to 14.2 years, n=695
[6] 95% confidence interval for number of occupants: 2.3 to 2.5, n=705
[7] 95% confidence interval for number of bedrooms: 2.4 to 2.5, n=724

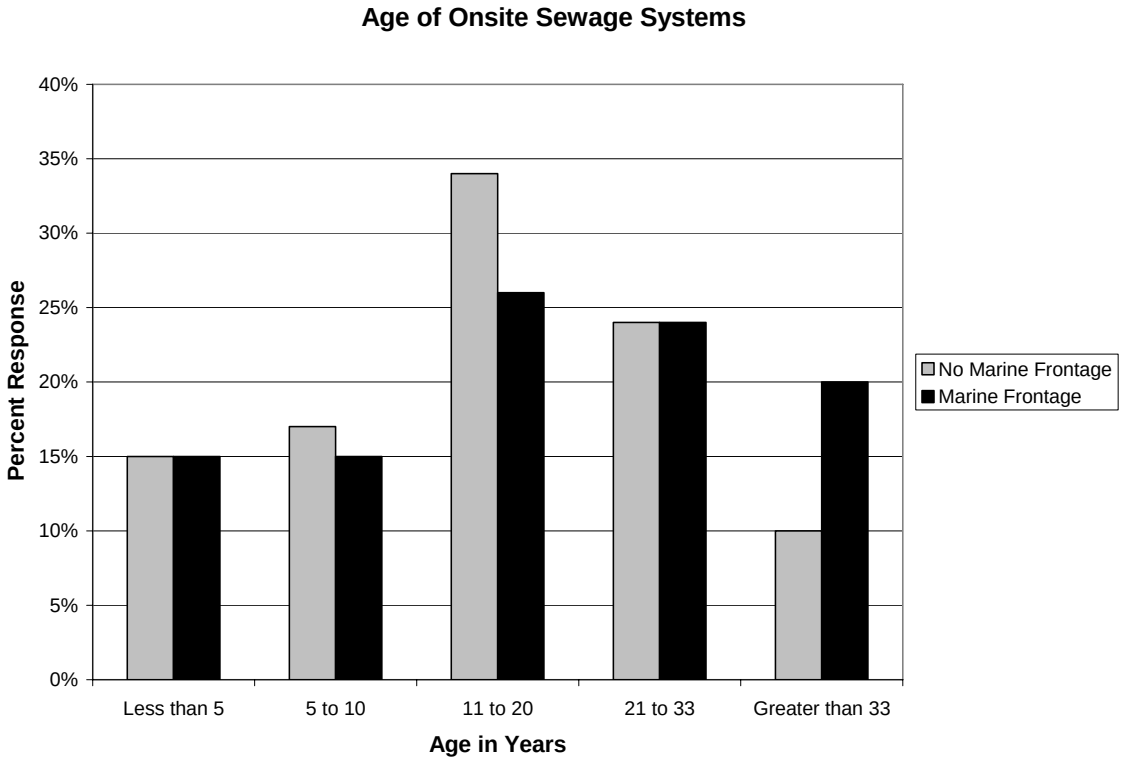


Figure 1. Age of onsite sewage system in the Hood Canal watershed.

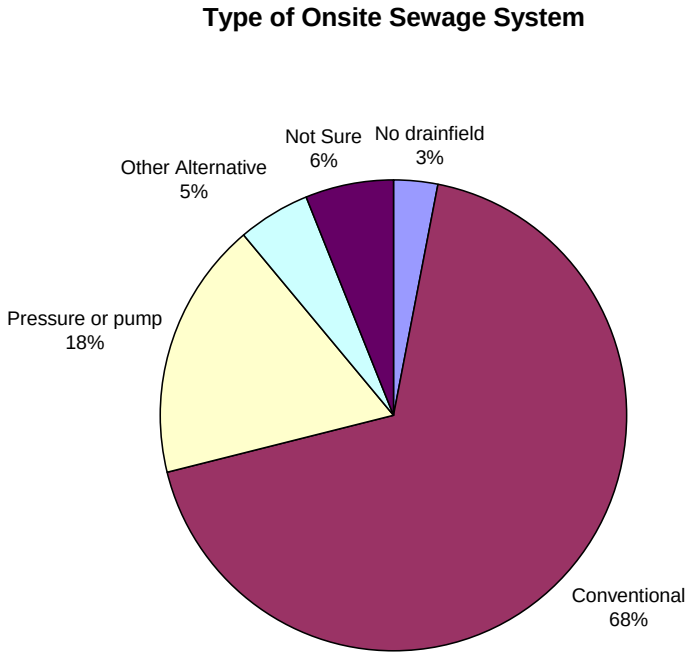


Figure 2. Proportion of each type of onsite sewage system in the Hood Canal watershed.

As would be expected based on the age of onsite sewage systems, most of the onsite sewage systems in the Hood Canal watershed are conventional, gravity onsite systems (Figure 2). About 3% of homeowners have either seepage pits or septic tanks without a drainfield.

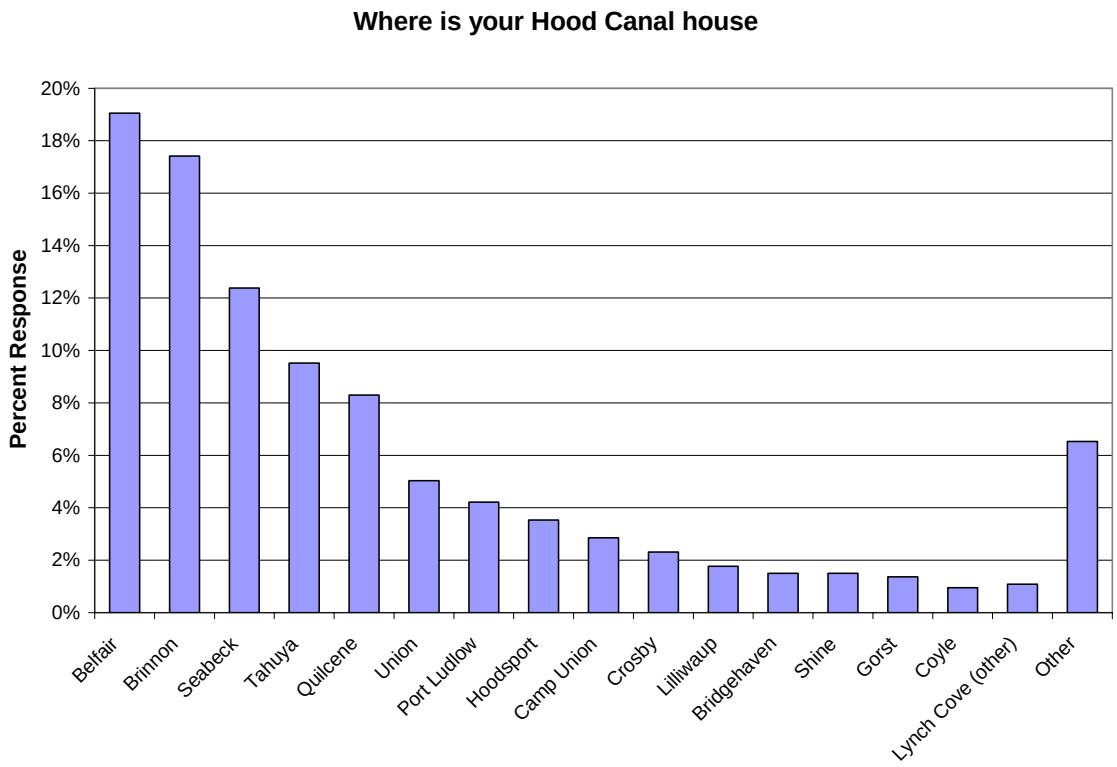


Figure 3. Distribution of which community homeowners indicated they were closest to.

The survey respondents identified themselves with living in one of about 25 communities. Most commonly, respondents' houses were in Belfair or Brinnon (Figure 3).

Overall, the usage of homes in the Hood Canal watershed is as follows:

- 68% permanent, basically year-round
- 10% weekend use
- 16% seasonal (summer)
- 5% "other"

However, these statistics do not accurately represent the watershed residency. The differences between those homes with marine frontage and those without are shown in Figure 4. There are significantly more homeowners that use their homes with marine frontage as weekend or for seasonal use than in the remainder of the watershed.[8]

[8] $\chi^2_{.05,3} = 108.2$, $p<.001$

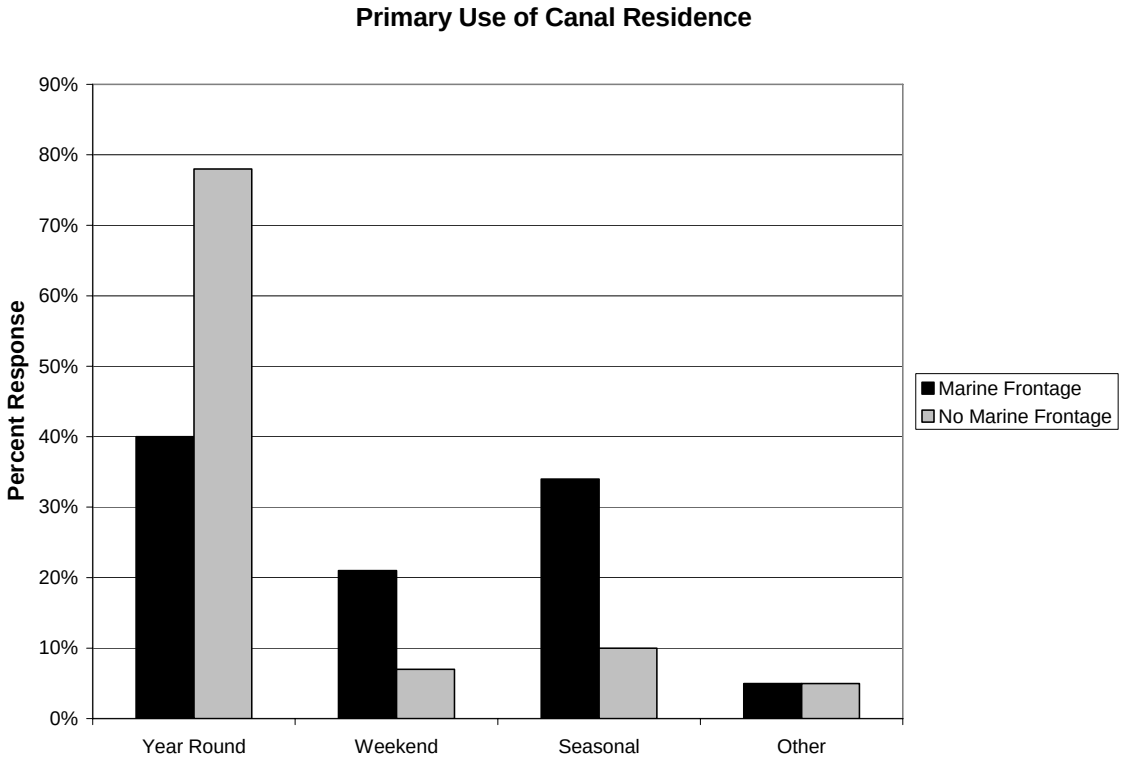


Figure 4. Response to question: what is your primary use of your Hood Canal residence?

Additionally, household income is significantly higher for those who own homes with marine frontage versus all others in the watershed.[9] Overall, more than 37% of homeowners who have marine frontage have income of $100,000 per year or greater. About 20% of the homeowners who have marine frontage have incomes of $40,000 per year or less.

[9] P<.001,t=5.747, df=240

Low Dissolved Oxygen

The survey asked several questions about the understanding and concerns that homeowners had about the low dissolved oxygen conditions in Hood Canal. Overall 88% of the homeowners in Hood Canal have heard of the low dissolved oxygen condition. There was no statistical difference in the response from homeowners who lived full-time, year-round in the Hood Canal watershed versus those that did not.

Significantly more homeowners that think scientific understanding is fair or poor versus those that think scientific understanding is good or excellent (Figure 5)[10]. Interestingly, more homeowners in Hood Canal believe low dissolved oxygen is "a big problem" versus "not a big problem" (Figure 6)[11].

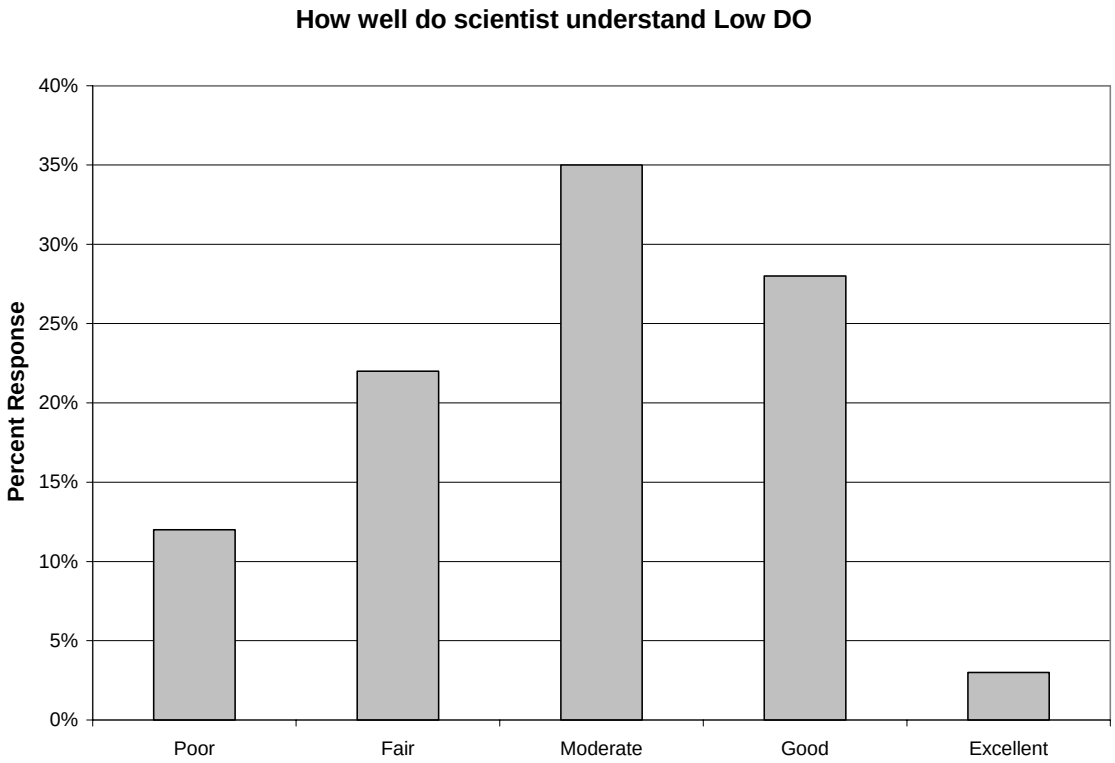


Figure 5. Response to question: how good is the scientific understanding of causes of low DO in Hood Canal.

Homeowners were neutral when questioned about whether they believed human sewage contributed to low DO in Hood Canal. Significantly more homeowners believe that sewage treatment contributes to low dissolved oxygen than do not (Figure 7),[12] although the difference is not as graphically obvious as in Figure 6.

[10] p=.001, t = -3.192, df=667
[11] p<.001, t = 23.051, df=663
[12] p=.001, t = 3.484, df=657

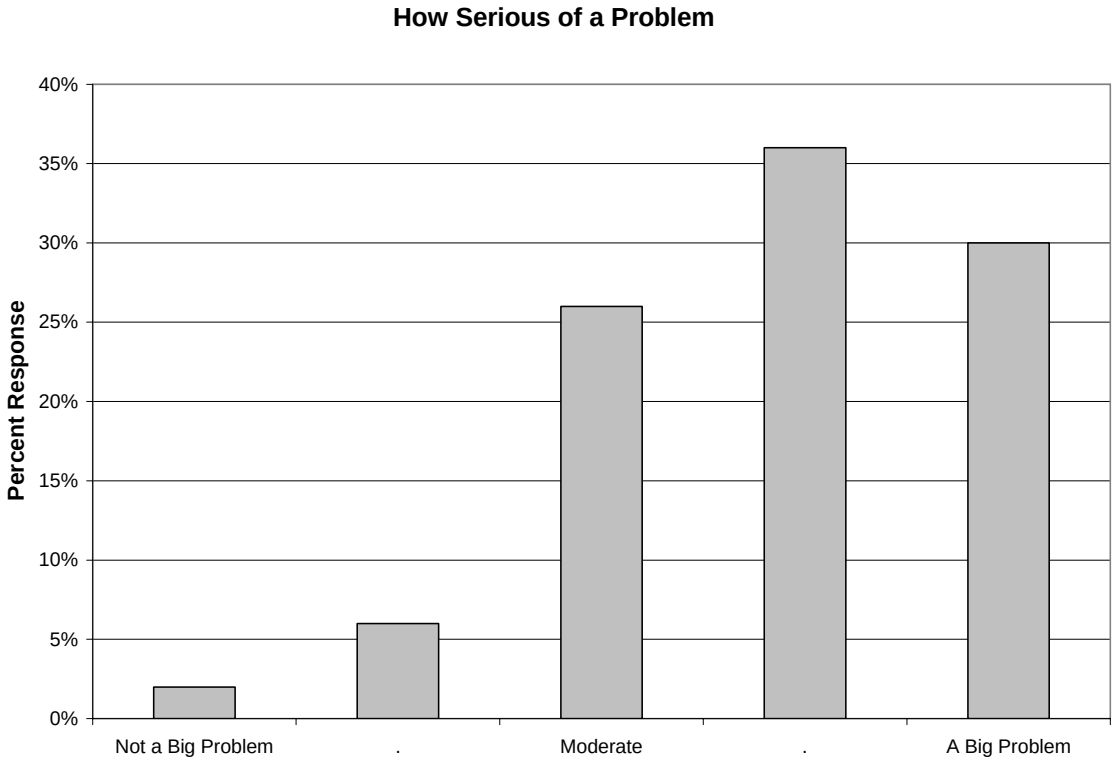


Figure 6. Response to question: How serious a problem is low DO in Hood Canal?

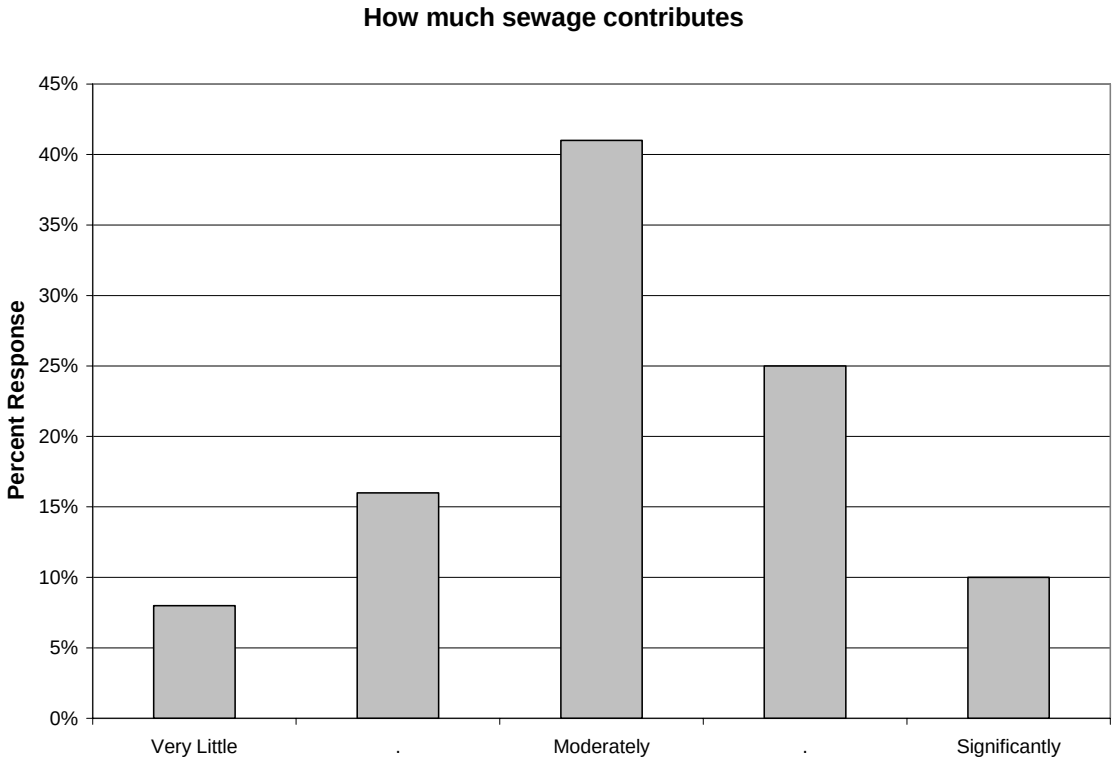


Figure 7. Response to question: How much does human sewage contribute to low DO?

General Stewardship Issues

As a whole, the population surveyed was relatively neutral about whether they felt responsibility to take actions to address the oxygen problem. The question was answered as follows:

- 36% said "yes"
- 27% said they felt "some responsibility"
- 37% said "no"

However, again there are significant differences between homeowners who had marine frontage on Hood Canal versus those without. Those homeowners who have marine frontage were significantly more likely to indicate they feel more responsible to take action for low dissolved oxygen conditions (Figure 8) than the rest of the watershed[13].

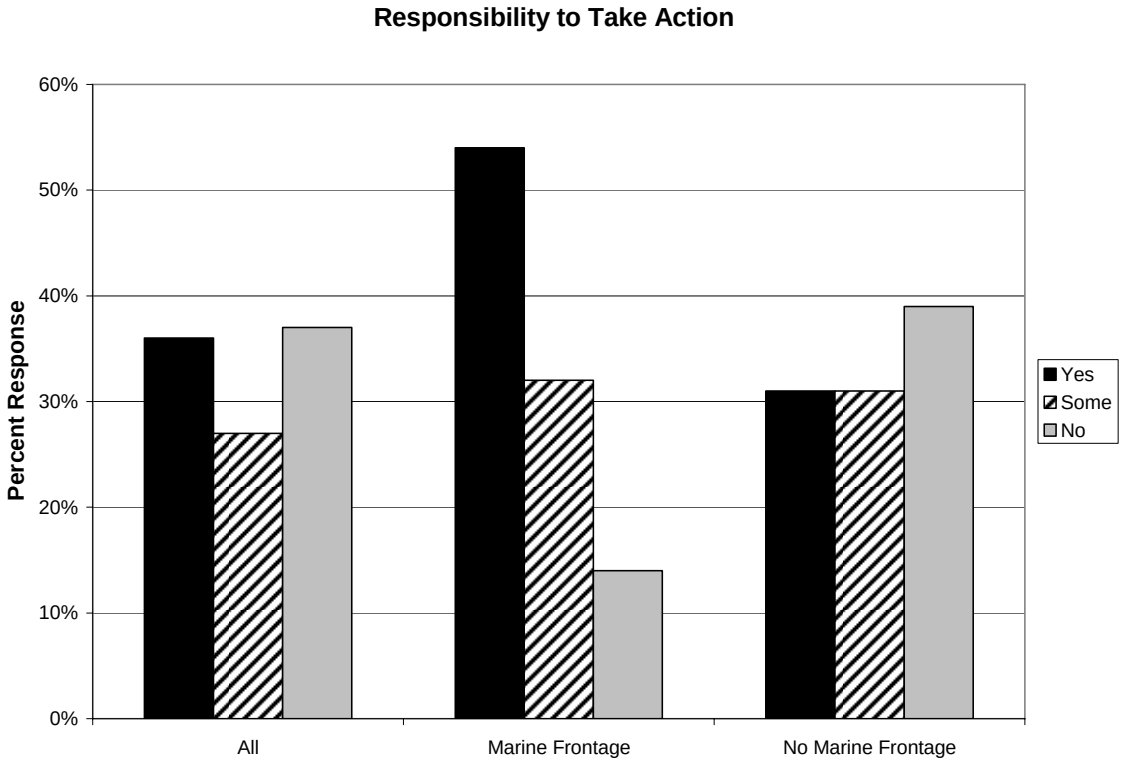


Figure 8. Response to question: do you feel responsibility to take action to address low dissolved oxygen conditions in Hood Canal.

[13] P<.001, t=4.240, df=425

Specific Stewardship Actions Regarding Onsite Sewage

One question asked homeowners if they would voluntarily join an onsite sewage management cooperative at a cost of $20 per month. The response was as follows:

- 6% Definitely would
- 37% Maybe, need more information
- 21% Probably not
- 24% Definitely not
- 12% Not sure

But, again there was a significant difference between those that have marine frontage versus those without (Figure 9). Those homeowners with marine frontage were significantly more likely to want to join a management cooperative than those homeowners in the rest of the watershed.[14]

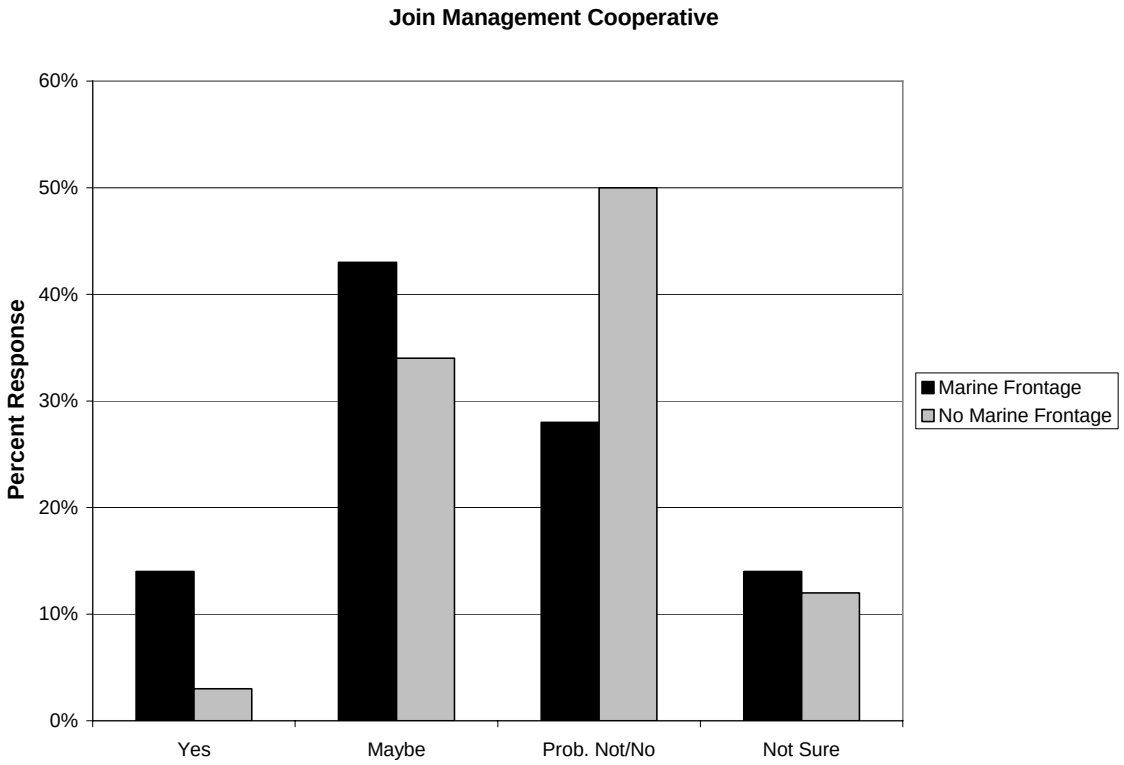


Figure 9. Response to question: would you join an onsite sewage management cooperative at a cost of $20/month?

[14] p<.001, t=4.578, df=752

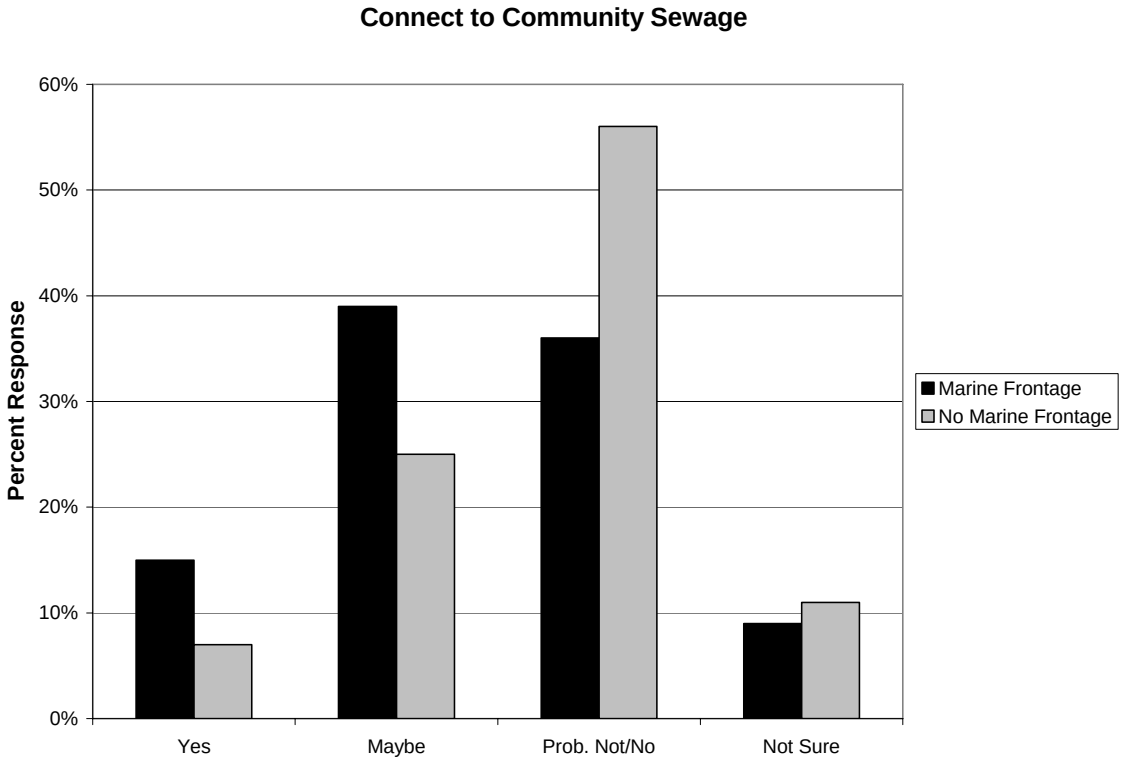


Figure 10. Response to question: would you connect to a community sewage system if the cost were $15,000?

There was a similar significant difference in how people responded to the question if they would voluntarily connect to a community sewage system.[15] Those homeowners with marine frontage were significantly more likely to say "yes" or "maybe" versus those without marine frontage (Figure 10).

In contrast to the differences in responses to questions regarding connecting to community sewage systems, all homeowners in the watershed have similar opinions about voluntary onsite sewage upgrades. Overall, there is less support in voluntary onsite sewage upgrades. And, in contrast to sewage management cooperative and community system connections, there are no significant differences based on whether the property owner had marine frontage or not. This less enthusiastic support of voluntary onsite sewage system upgrades is present with both options for low interest loans or for interest-free, payment-deferred loans (Figure 11).

[15] $p<.001$, $t=4.498$, $df=732$

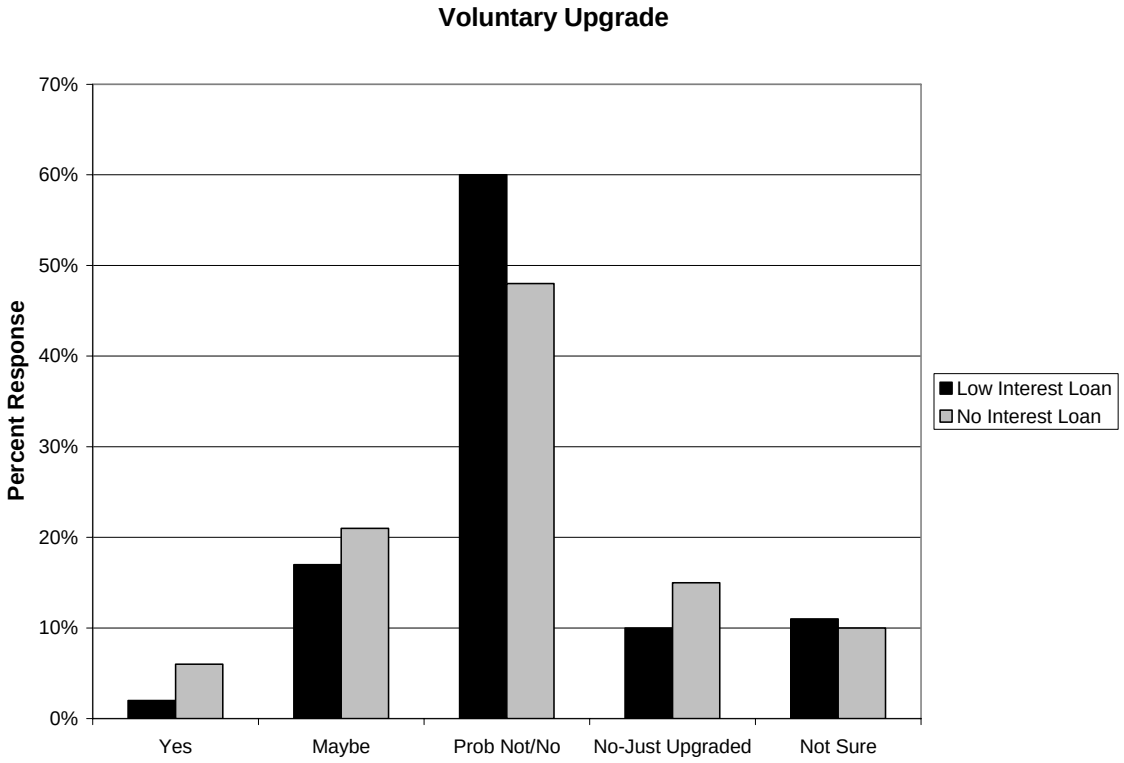


Figure 11. Response to question: would you voluntarily upgrade your onsite sewage system if the cost were $15,000?

Additional analyses will be conducted, based on the request of the HCCC Board, and when specific policy questions are asked that can be informed by the survey data. These potential future analyses will be added to this "interim" report for inclusion with the final report to the Department of Ecology.

County-Specific Analyses

From a policy perspective, it is important to know how each county's homeowners attitudes are similar and how they differ. Policies are established at the county level for many aspects of sewage management, especially in the onsite sewage regulatory arena. Therefore, we conducted pairwise comparative analyses between counties.

The factor that seemed to determine significance for all others was once again the difference in attitudes between residents with waterfront homes versus the rest of the watershed. All the county differences could be explained, with stronger statistical power, simply by the percentage of waterfront homeowners represented in the sample.

Figure 12 shows that 40 percent of Mason County homeowners in the Hood Canal watershed have marine frontage and 60 percent of Mason County homeowners in the watershed do not have marine frontage. That is a higher proportion of marine frontage

than homeowners in Jefferson County have and much higher than in Kitsap County. That difference (marine frontage vs. not marine frontage), and the attitude differences between the homeowners from those two groups, drive some differences between the counties. However, these differences are not necessarily county specific, they are simply a function of the different amount of marine frontage in each county.

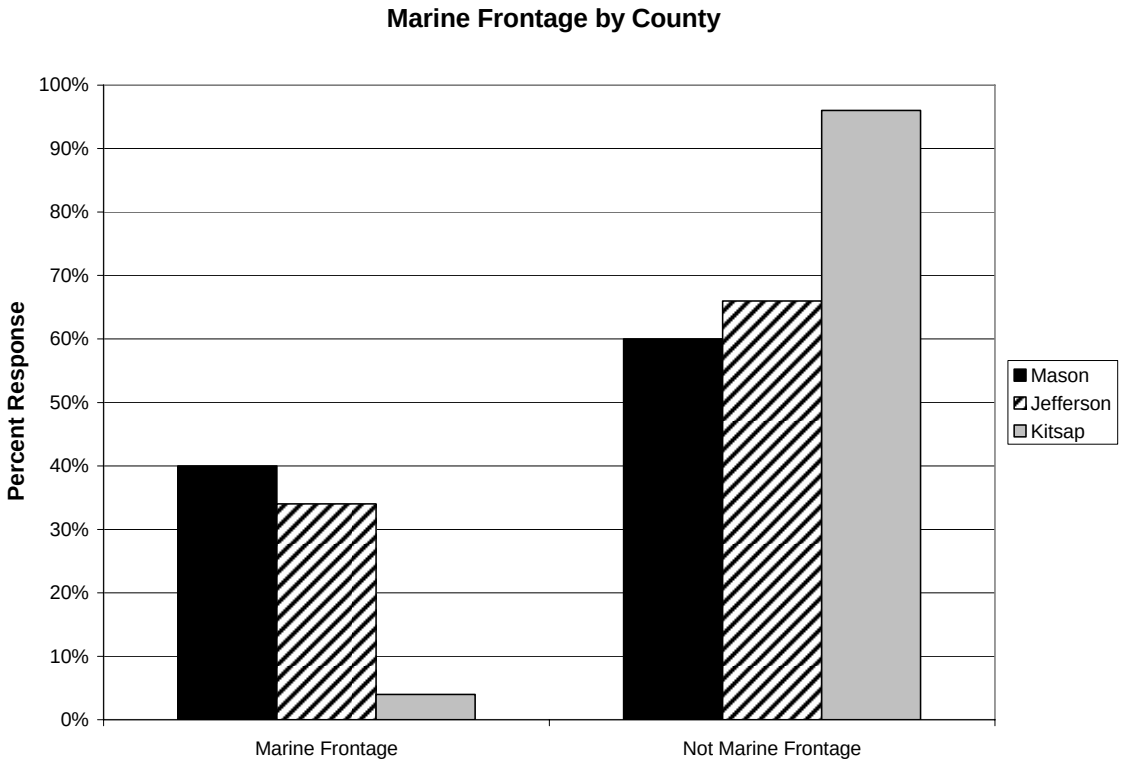


Figure 12. Proportion of homeowners indicating marine frontage and not indicating marine frontage broken out by county.

For example, there appears to be significant differences between Kitsap County and Mason County on a number of factors when pairwise comparisons are made. These include:

- Mason County homeowners feel more responsibility than Kitsap County homeowners to take action to address low dissolved oxygen
- Mason County homeowners have a higher income than Kitsap County homeowners
- Mason County homeowners are more willing to join a management cooperative (at a hypothetical cost of $20 per month) than Kitsap County homeowners
- Mason County homeowners are more willing to connect to community sewage system (at a hypothetical cost of $15,000) than Kitsap County homeowners
- There were no differences between Mason County and Kitsap County in homeowners' willingness for voluntary upgrades of onsite sewage systems.

However, none of these statistical differences are as strong as the differences measured between marine waterfront homeowners versus homeowners in the rest of the watershed. Therefore, we believe that these differences may be "autocorrelated", meaning that the significance is based on related factors and not cannot be directly attributed to county of origin. Further analysis will be made into determining the statistical implications.

There were no pairwise statistical differences between Jefferson County and Kitsap County, or Jefferson County and Mason County. In many ways, data for Jefferson County homeowners appear to be midpoint between Kitsap and Mason. On a spectrum, Mason County has the highest proportion of marine waterfront homeowners, Jefferson County has the next highest, and Kitsap County is a distant third. The statistical differences noted in attitudes could be explained simply by that one population attribute.

Demographic Comparison to U.S. Census of 2000

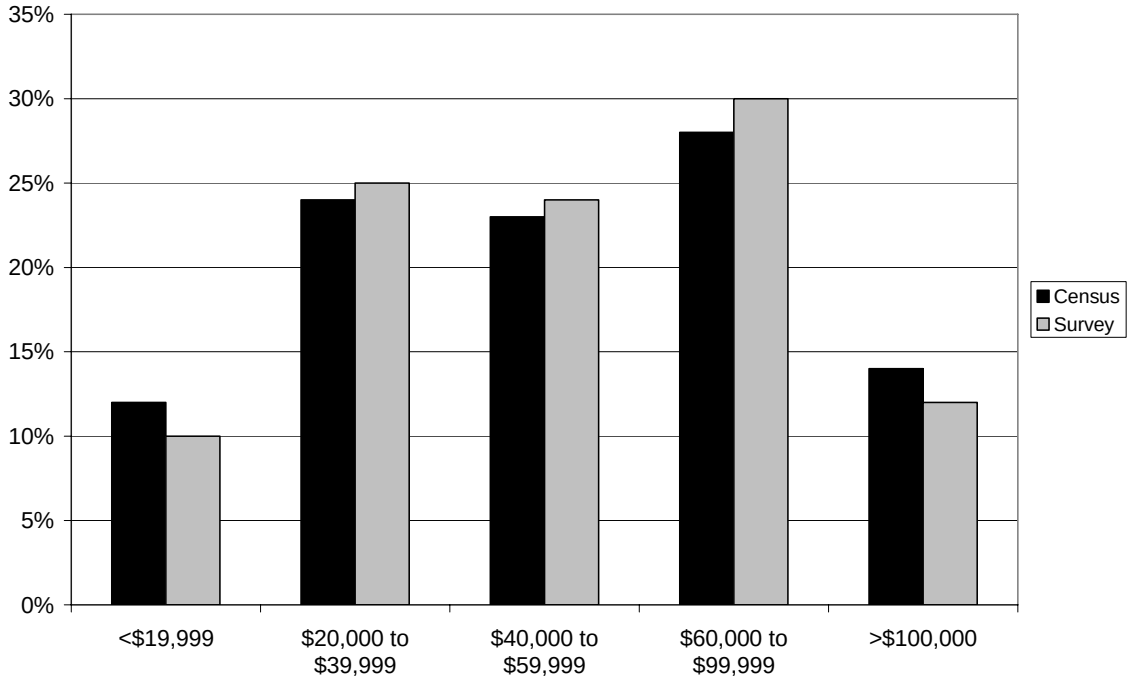
In order to make estimates for the entire Hood Canal population from the HCCC Attitude Survey, we had to determine if the demographic information was consistent between the sample and the population. To do this, we asked questions that could be directly compared to the U.S. Census related to:

- Income
- Education
- Age
- Tenure (length of time living in the house)
- Number of Bedrooms in the house
- Number of Occupants in the house

The results are tabulated in Appendix A. Overall, there was general agreement between the demographic parameters in the census population and the sample obtained from the HCCC survey. The detailed data obtained from the census, and the methodology used in calculating census population in the Hood Canal watershed is in Appendix B, which is NOT included with this report. Appendix B can be obtained by contacting HCCC staff.

Appendix A. Demographic Comparisons between Hood Canal Survey and 2000 US Census Data

Income



Education

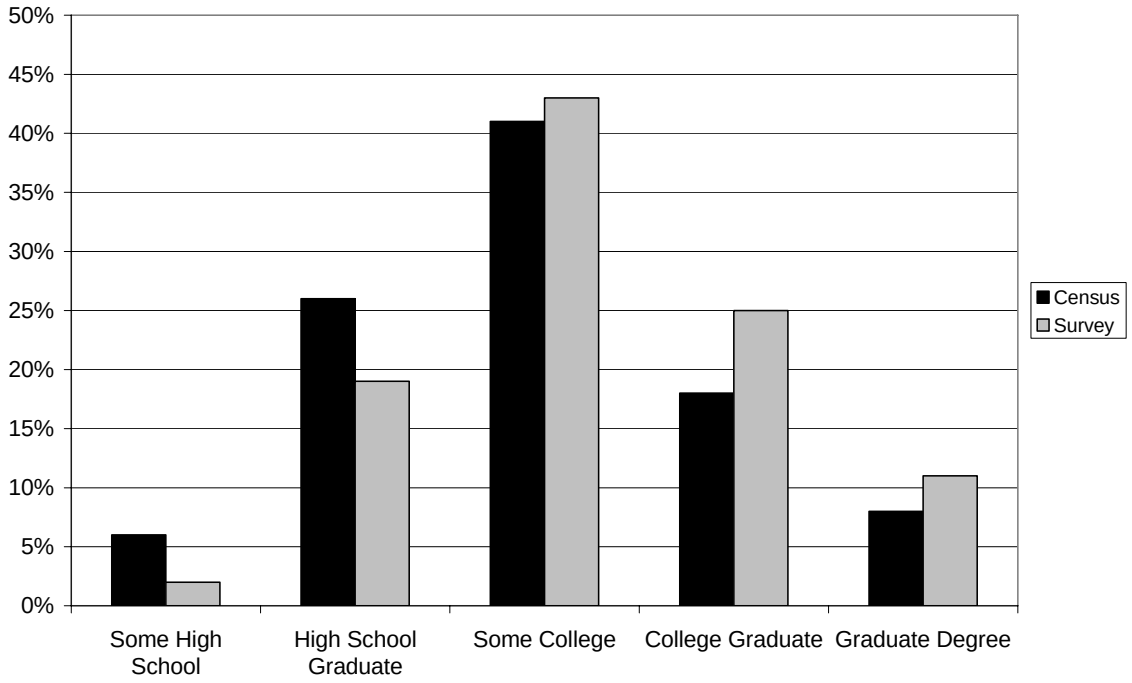


Table A-1. Demographic comparison "Permanent-year round" in survey vs. census "homeowners"

Question	Category	Census	Survey
Age	Under 25	1%	0
	25-34	7%	5%
	35-44	22%	15%
	45-54	27%	27%
	55-64	19%	24%
	65-84	22%	26%
	85 and over	1%	3%
Yrs in House	< 2	11%	10%
	2-5	28%	23%
	5-10	25%	20%
	10-20	22%	26%
	>20	14%	22%
No. Bedrooms	1	6%	7%
	2	25%	34%
	3	50%	50%
	4	15%	8%
	>4	2%	1%
Household Size			
	1	18%	17%
	2	43%	54%
	3	15%	12%
	4	15%	11%
	>4	9%	6%